Analysts' earnings forecasts and international asset allocation

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Abstract

The aim of this paper is to investigate whether financial analysts' earnings forecasts are informative from the viewpoint of allocating investments across different stock markets. Therefore we develop a country forecast indicator reflecting the analysts' prospects for specific stock markets. The country forecast indicator is defined as the number of companies within one and the same stock market for which analysts revise their current year earnings forecast upward divided by the total number of companies for which analysts revise their current year earnings forecasts anyway.

Based on the available analysts' earnings forecasts in the Institutional Brokers Estimate System (I/E/B/S), we calculate a monthly country forecast indicator for the stock markets in Germany, France, Italy, The Netherlands, United Kingdom, and Switzerland over the period 1990 to 1994. The time-series correlations between the monthly value of the indicator and the stock market returns around the date of calculating the indicator show that stock returns rather precede than follow revisions in earnings forecasts. An investment strategy which is based on a monthly asset allocation to that stock market with the highest value of the country forecast indicator in the preceding month, gives a slight outperformance (around 3 percent excess return) compared to an equal allocation of funds to the stock markets involved.

JEL classification code: G11

1. Introduction

Within the empirical finance and accounting literature the relationship between the announcement of analysts' revisions in earnings forecasts and stock price reactions has attracted much attention. Most research is concerned with earnings forecasts of individual companies within a specific stock market, trying to answer the question whether revisions in earnings forecasts are useful for a investment strategy which is based on the selection of under or overpriced companies.

In this paper we investigate the usefulness of these analysts' earnings forecast revisions with respect to the allocation of funds to stock markets in different countries. Therefore, we develop a country forecast indicator which represents the analysts' outlook for specific stock markets. The country forecast indicator is defined as the number of companies within one and the same stock market for which analysts revise their current year earnings forecast upward as a percentage of the total number of companies with a forecast revision anyway (both upward and downward). In other words, we aggregate the analysts' earnings forecasts of individual companies toward a country forecast indicator.

In order to calculate the country forecast indicator, we use earnings forecasts of individual analysts concerning companies which are quoted on the stock markets in Germany, France, Italy, The Netherlands, United Kingdom, and Switzerland. These individual forecasts are aggregated to monthly consensus forecasts for the period from 1990 to 1994. The analysts' earnings forecasts are extracted from the Institutional Brokers Estimate System (I/B/E/S)[1]. In order to investigate whether our country forecast indicator contains useful information for a country asset allocation strategy, we correlated the monthly value of the indicator with the returns of the Morgan Stanley Country Indices around the date of calculating the indicator over a 60 months period. Further, we calculated the abnormal return of an investment strategy, which is based on the monthly asset allocation to that stock market which showed the highest country forecast indicator in the preceding month.

The structure of the paper is as follows. In section 2, we review the empirical literature with respect to the relationship between the revisions in analysts' earnings forecasts and stock returns. In section 3 we describe our research methodology together with the to be tested. In

[1] The authors gratefully acknowledge the support of I/B/E/S Inc. for making available the analysts' earnings forecasts which are included in the Institutional Brokers Estimate Service.

section 4 we discuss our data and in section 5 the empirical results are presented. Section 6 ends with conclusions and suggestions for further research.

2. Previous research

As we noted in the introduction, most studies with respect to the relationship between analysts' earnings forecasts and stock returns are concerned with the usefulness of published earnings forecasts for individual stock selection strategies within a specific stock market. The question whether earnings forecast are helpful with respect to the international asset allocation has been paid less attention to. In discussing previous research results we distinguish between these categories.

In the category of studies where stock price reaction are measured around the announcement of revisions in analysts' earnings forecasts, it is usual to make a distinction between stock price reactions before and after the announcement of revisions. Studies concerned with stock price reactions in the pre-revision period (normally 6 to 12 months) report a positive and significant correlation between the direction and size of the earnings revisions on the one hand and abnormal returns on the other hand. Brown *et al*. (1985) found an average positive abnormal return of about 5 percent for companies with increasing earnings forecasts, while companies with decreasing earnings forecasts underperformed about 8 percent on average. Huijgen and Feenstra (1995) reported similar results; in the pre-revision period the abnormal returns of portfolios containing companies with upward and downward revision were about 7 percent positive and 4 percent negative respectively. Studies investigating stock price reactions in the post-revision period are less unanimous. Some studies report no significant abnormal returns, neither immediately nor during longer periods after the announcement of analysts' earnings forecast revisions (Elton *et al*., 1981; Abdel-khalik and Ajinkya, 1982; Huijgen and Feenstra, 1995). This implies that investment strategies based on the selection of companies with forecast revisions will not perform different from a buy and hold strategy on average. Other studies, however, show results which confirm the presence of significant abnormal returns in the post-revision period, especially for large forecast revisions (Givoly and Lakonishok, 1980; Hawkins *et al.,* 1984). Stickel (1991) found abnormal returns lasting up to six months after the announcement of changes in earnings forecasts. Explanations for this kind of 'efficient market anomaly' studies are however vague and mostly missing.

In the category of studies, where published earnings forecasts are used for investment allocation decisions with respect to countries, only the post-revision period returns have been investigated. For a sample of 24 countries, Emanuelli and Pearson (1994) calculated the results of an investment strategy, which was based on the monthly asset allocation to those 5 stock market with the highest earnings revision ratio. This ratio is comparable to our country forecast indicator[2]. They found a positive abnormal return of about 6 percent over a period of 12 months following the date of the calculation of the earnings revision ratio. The monthly allocation to those 5 countries with the lowest earnings revision ratio resulted in a negative abnormal return of about 4 percent. There results were striking in so far, that the abnormal returns were built up regularly during the 12 months' period. That is: the delay of reaction in stock prices upon published information continued until 12 months later. For a sample of 7 European stock markets, Bercel (1984) investigated the relationship between the ratio of the number of upward and downward revisions for companies within one stock market on the one hand and the following 30 days abnormal return on that stock market on the other hand. For 5 out of these 7 stock markets, the abnormal returns for high and low values of this ratio were significantly different.

3. Research methodology

In order to calculate the monthly country forecast indicator, earnings forecast of individual analysts referring to individual companies have to be aggregated twice. The first step involves the aggregation from forecasts of individual analysts concerning one and the same company to a consensus forecast for that company. The reason for using our own consensus forecast, and not rely on the consensus forecast published by I/B/E/S, is that the I/B/E/S consensus forecasts is calculated out of all analysts which deliver their forecast to I/B/E/S, where some forecasts of individual analysts may be out of date[3]. We choose to create our consensus from the most recent 6 individual forecasts, which guarantees a timely forecast. The second step involves the aggregation from consensus forecasts referring to individual companies to a forecast referring

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[2] The earnings revision ratio is defined by Emanualli and Pearson (1994) as the number of upward revisions within a stock market divided by the number of downward revisions during a month. Our country forecast indicator is different in so far, that we divide by the total number of revisions (both upward and downward).

[3] O'Brien (1988) concludes that consensus forecasts, which are composed of the most recent individual forecasts are more accurate than the consensus forecasts delivered by I/B/E/S. In fact, the advantage of timeliness, using the most recent individual forecasts counterbalances the advantage of taking all available individual forecasts, where independent forecast errors of individual analysts will be diversified away.

to specific stock markets. Since we are interested in revisions, and not so much in the value of the forecasts, we calculated for each stock market the monthly ratio between upward and downward revisions in consensus forecasts referring to individual companies, which are listed on that stock market. We did not take the magnitude of the revision into consideration, but only the sign. The monthly country forecast indicator is thus defined as the number of companies within one and the same stock market for which the monthly consensus current year earnings forecast is revised upward as a percentage of the total number of companies with a monthly consensus forecast revision anyway. The higher the value of the country forecast indicator, the more optimistic analysts are about the companies' prospects within a country. The value of the indicator is bounded by zero and hundred percent, as long as there are one or more monthly upward or downward revisions within the period of a month. The average value of the indicator will be around one-half, if analysts have no optimistic or pessimistic bias in their forecasts consistently.

To investigate whether stock price reactions precede or follow revisions in forecasts, we test the following hypotheses:

Hypothesis 1: There will be a positive time-series correlation between the value of the country forecast indicator and the market return of the respective stock market in the 3 months' period preceding date of calculation of the indicator.

Hypothesis 2: There will be a positive time-series correlation between the value of the country forecast indicator and the market return of the respective stock market in the 3 months' period following the date of calculation of the indicator.

Hypothesis 3: An investment strategy which is based on the monthly asset allocation to that stock market with the highest value of the country forecast indicator in the preceding month will create a positive abnormal return.

4. Data

For the calculation of the monthly country forecast indicator, we use the earnings forecasts of financial analysts concerning individual companies, which are included in I/B/E/S over the period from 1990 to 1994. Before 1990 there are insufficient earnings forecasts to give a reliable indicator for each country. The monthly consensus earnings forecast for each

company is the unweighed average of the most recent individual forecasts, which are made before the end of the month and which refer to the earnings of the current financial year. Since the indicator measures the revision in the monthly consensus earnings forecasts, we used 13 monthly consensus forecasts for each company, which start 3 months before the end of the previous financial year and end 3 months after the end of the current financial year. In this way, we take into account that there is a delay of some months in the disclosure of the annual report by companies. For example: for a company, which financial year ends on 31 December 1990, we calculated the monthly consensus forecasts over the period from March 1990 to March 1991, which refer to the 1990 financial year. Thus, the revisions in consensus forecasts for this company run from April 1990 to March 1991. Companies, for which forecasts are not available yet 3 months after the beginning of the financial year, are left out of the sample for the whole year.

The monthly returns of the country indices are measured as the total rate of return of the Morgan Stanley Country Indices expressed in local currency[4]. In this way, we have some comparability in the composition of the indices for the countries involved. We use the same indices for the calculation of the abnormal return of an investment strategy, which is based on the monthly investment of funds in that stock market, which had the highest value of the country forecast indicator in the previous month. The abnormal return is measured as the total rate of return of the investment strategy corrected for the unweighed average of the total rate of return for the six country indices considered.

5. Results

We investigated 87288 individual analysts' earnings forecasts in total, which are aggregated towards monthly consensus forecasts for individual companies in the first step and further aggregated towards monthly country forecast indicators in the second step. In table 1 we present some general characteristics of the database and the indicator we constructed. The number of individual forecasts ranges from 6493 for Switzerland to 47761 for the United Kingdom.

[4] The Morgan Stanley Country Indices are composed of the most important companies on a stock market, which are weighed by their market values. The number of companies included in the indices differs for each country. The monthly returns of the Morgan Stanley Country Indices are extracted from Datastream International.

Table **1**: Sample properties and characteristics of the indicator

Country	No. of forecasts	Av. age of consensus (months)	% forecasts before reporting year	% forecasts 1st half of reporting year	% forecasts 2nd half of reporting year	% forecasts after reporting year
Germany	10,076	1.31	0.0%	31.4%	68.6%	0.0%
France	15,111	1.74	0.0%	40.6%	59.4%	0.0%
Italy	6,799	1.60	0.0%	27.1%	72.9%	0.0%
Netherlands	11,124	2.38	4.1%	34.3%	41.1%	20.0%
United Kingdom	47,761	1.38	0.0%	43.7%	56.2%	0.0%
Switzerland	6,493	1.78	0.0%	36.2%	63.8%	0.0%

In the first step of calculating our indicator, we constructed a consensus forecast for each individual company consisting of the 6 most recent forecasts. In the third column, we present the average age of the forecasts used in constructing a consensus. From table 1 we can see that the average age of the forecasts used in the consensus range from 1.31 for Germany to 2.38 for the Netherlands. As we use monthly rebalancing periods for our investment strategy, we would have preferred that the avereage age of the forecasts in the indicator was below 1. However, this involves a further reduction of the already small number of forecasts included in the calculation of the consensus forecast.

In the last four columns of table 1, we present the percentage of forecasts generated by analysts in a specific period. In the period preceding the reporting year, the I/B/E/S database contains only forecasts for companies in the Netherlands. Most forecasts are generated in the 2nd half of the reporting year. This means that the forecasting horizon of the analysts is on average less than 6 months. Furthermore, it is interesting to note that the analysts from the Netherlands generate a considerable amount of forecasts after the end of the reporting year.

Table **2**: Average value of the country forecast indicators for each month for each country, 1990-1994.

country month	Germany	France	Italy	Nether- lands	United Kingdom	Switzerland
January	50.29%	46.49%	50.59%	44.81%	36.77%	40.56%
February	39.05%	35.99%	51.00%	42.95%	37.21%	39.00%
March	43.00%	44.32%	43.76%	50.88%	40.45%	51.26%
April	54.20%	47.74%	47.40%	50.59%	41.56%	51.71%
May	45.92%	51.19%	49.16%	52.38%	41.46%	44.12%
June	50.06%	47.09%	49.60%	43.07%	43.00%	44.69%
July	40.40%	42.31%	49.34%	46.93%	36.39%	47.37%
August	43.22%	39.98%	51.52%	44.92%	37.02%	46.09%
September	41.07%	42.34%	47.51%	41.15%	36.70%	44.71%
October	40.98%	38.49%	50.16%	42.94%	38.58%	40.58%
November	42.63%	38.35%	45.40%	44.81%	39.34%	40.86%
December	46.32%	39.81%	51.71%	46.97%	37.27%	50.04%
average	44.76%	42.84%	48.93%	46.03%	38.81%	45.08%

Table 2 shows the value of the country forecast indicator for each country. The monthly value is averaged over the period from 1990 to 1994. We notice that the value of the indicators is below 50 percent in most of the months, which means that analysts revise their forecasts more downward than upward. This phenomenon can be explained as an early analysts' optimism with respect to the earnings for the current year, which is corrected downward throughout the year, when more company specific information becomes available, such as quarterly reports. Emanualli and Pearson (1994) found an equal pattern for a much larger group of countries[5].

[5] Studies with respect to the accuracy of analysts' earnings forecasts (Klein, 1990; Capstaff *et al.*, 1995) confirm our results in a different way. These studies show that analysts are better able to forecast earnings for companies, which report actual earnings increases, than for companies which report actual earnings decreases. This pattern can possibly be explained by agency relationships between analysts and companies' management in the sense that analysts are less able to gather private information from the company in the case of a pessimistic forecast.

Table **3**: Time-series pairwise Spearman rank correlations of the value of the monthly country forecast indicators between countries, 1990-1994.

country / country	Germany	France	Italy	Nether-lands	United Kingdom	Switzer-land
Germany	1.000	0.320*	0.085	0.207	0.357**	0.034
France	0.320*	1.000	0.191	0.331**	0.343**	0.096
Italy	0.085	0.191	1.000	0.111	-0.130	0.194
Netherlands	0.207	0.331**	0.111	1.000	0.319*	0.247
United Kingdom	0.357**	0.343**	-0.130	0.319*	1.000	0.032
Switzerland	0.034	0.096	0.194	0.247	0.032	1.000

** significant on 1% level (two-tailed test);
* significant on 5% level (two-tailed test).

Table 3 reports the pairwise Spearman rank correlations[6] in the monthly country forecast indicators between the countries over a period of 60 months. Due to worldwide influences of for instance economic growth figures or interest rates on companies' earnings, one should expect a positive correlation in the change of the indicator between the countries. From table 3, we notice a pairwise correlation between the group of Germany, France, The Netherlands, and the United Kingdom which is considerably higher (and significant) than the pairwise correlation between the Italy and Switzerland.

Table **4**: Time-series pairwise Spearman rank correlations of the total return of the MSCI country indices between countries, 1990-1994.

country / country	Germany	France	Italy	Nether-lands	United Kingdom	Switzer-land
Germany	1.000	0.636	0.532	0.687	0.591	0.547
France	0.636	1.000	0.502	0.747	0.737	0.594
Italy	0.532	0.502	1.000	0.520	0.405	0.400
Netherlands	0.687	0.747	0.520	1.000	0.782	0.721
United Kingdom	0.591	0.737	0.405	0.782	1.000	0.707
Switzerland	0.547	0.594	0.400	0.721	0.707	1.000

All coefficients are significant at the 1% level.

[6] The Pearson correlations, which account for the size in the value of the observations and not only the rank, give comparable results.

In Table 4 we report the pairwise Spearman rank correlations in the monthly returns of the stock market indices between the countries over a period of 60 months. As compared to the correlations in the indicators, the correlations in stock market returns is much higher.

Table **5**: Time-series pairwise Spearman rank correlations between the value of the country forecast indicators and the market returns for each country, 1990-1994.

country correlation	Germany	France	Italy	Nether-lands	United Kingdom	Switzerland
$\rho(r_{t-2}, I_t)$	0.161	0.291*	0.156	0.270*	0.037	0.100
$\rho(r_{t-1}, I_t)$	0.113	0.217	-0.027	0.108	0.144	0.290*
$\rho(r_t, I_t)$	0.261*	0.025	-0.239	0.056	0.061	-0.024
$\rho(r_{t+1}, I_t)$	-0.021	-0.146	-0.038	0.075	-0.098	0.007
$\rho(r_{t+2}, I_t)$	-0.043	0.248	-0.098	-0.066	-0.092	0.017
$\rho(r_{t+3}, I_t)$	-0.020	-0.072	-0.124	-0.092	-0.161	-0.216

** significant on 1% level (two-tailed test);
* significant on 5% level (two-tailed test).

I_t is the value of the indicator at the end of month t;
r_t is the return of the MSCI country index during month t.

Table 5 gives the results of the mutual dependency between the value of the indicator and the returns of the country indices, which are formulated in hypotheses 1 and 2. The upper three rows in table 5 show the Spearman rank correlations between the value of the indicators and the returns of the country indices in the 3 months before the date of calculating the indicators (pre-revision period). The lower three rows in table 5 show the correlations in the 3 months after the date of calculating of the indicators (post-revision period). In the pre-revision period, there is some evidence for a positive relationship, but only 4 out of the 18 correlations are significant. We remark however that with a significance level of 5 percent, only 1 out of the 20 correlations would be significant by chance. These results give some support for hypothesis 1. In the post-revision period we cannot find any relationship between the value of the indicators and the returns of the country indices. In none of the countries, the correlation is significantly positive, while we would expect one correlation to be significant by chance. Moreover, the correlations are negative in 14 out of the 18 cases, without any reasonable level of significance however. Thus, we reject hypothesis 2.

Table **6**: Average value of the country forecast indices, average yearly market return and the chosen investment strategy, 1990-1994.

characteristics country	average value indicator	% change indicator 1990-1994	number of periods invested in	average yearly market return
Germany	44.76%	-17.12%	10	5.08%
France	42.84%	26.91%	5	4.32%
Italy	48.93%	-27.58%	25	6.53%
Netherlands	46.03%	28.76%	7	11.44%
United Kingdom	38.81%	12.37%	1	10.19%
Switzerland	45.08%	-29.13%	12	12.09%
average	44.41%	-0.97%	10	8.28%

Table 6 presents some figures about the results of the investment strategy, which is based on the monthly asset allocation to the stock market with the highest value of the forecast indicator in the preceding month. The results show that in 25 months out of the total period of 60 months investigated, funds should be invested in the Italian index. Indeed, Italy has the highest country forecast indicator on average. If this strategy would be working, then one should expect some relationship between the number of periods investing in a specific country and the average yearly return of that country. The figures in the columns 4 and 5 in table 6 show that this relationship is hardly present. The actual yearly return of the investment strategy amounts 10.76 percent, while an unweighed allocation to all six countries gives a performance of 8.28 percent. There is some outperformance which is however not significant at any reasonable level of significance. Thus, hypothesis 3 is not confirmed by the results.

From the expectations generated by previous research, our results are somewhat dissapointing. Contrary to the work of Emanuelli and Pearson (1994), our indicator is not able to predict the future returns on stock markets. In addition, there is considerable support for the hypothesis that changes in earnings forecasts have a measurable impact on the stock market. Apparently, in the process of aggregating the individual numbers into a country indicator, we lost the predictive ability of earnings forecasts. An important characteristic of the indicator is the timeliness of the indicator. Although our indicator is based on the 6 most recent forecasts, which according to O'Brien (1988) is better than using the I/B/E/S consensus forecasts, it may be that our indicator is not timely enough. An indication of the timeliness of our indicator is the average age of the forecasts used in constructing the consensus forecasts. From table 1 we

know that the average age varies between 1.31 and 2.38 years. This could result in serial correlation in our indicator, which represents the degree of correspondence between the value of the indicator at time t and the value of the indicator at time t+n. If the serial correlation is high, then the information contained in the indicator is not very new to the investor. This means that - depending on the degree of market efficiency - the indicator will not be very useful for a portfolio strategy.

Table **7**: Coefficients of serial correlation

	$\rho(I_t, I_{t-1})$	$\rho(I_t, I_{t-2})$	$\rho(I_t, I_{t-3})$	$\rho(I_t, I_{t-4})$	$\rho(I_t, I_{t-5})$	$\rho(I_t, I_{t-6})$
Germany	-0.009	0.088	0.066	-0.003	0.018	-0.175
France	0.138	0.154	-0.132	-0.020	-0.184	-0.052
Italy	-0.013	0.043	0.053	0.005	-0.017	-0.048
Netherlands	0.397**	0.353**	0.199	0.171	0.121	0.096
United Kingdom	0.813**	0.700**	0.674**	0.603**	0.570**	0.573**
Switzerland	-0.001	-0.188	-0.106	-0.118	0.110	0.025

** significant on 1% level (two tailed test).

In table 7 we present the coefficients of serial correlation within the time series of our indicator. The table reveals interesting facts: for the Netherlands as well as the United Kingdom there is strong evidence of serial correlation within the indicator. However, the other counties in our sample do not exhibit significant serial correlation. Significant serial correlation in the indicator could mean that (1) the timeliness of the indicator is insufficient or (2) that the analysts exhibit herding behaviour.

The support for the first explanation is mixed. The average age of the forecasts exceeds 1 month, which suggests the possibility of serial correlation. However, the average age of the forecasts used in the indicator for the United Kingdom is relative low whereas the serial correlation is the highest. The only observation supporting this explanation is from the Netherlands, with the highest average age for the forecasts in the indicator, and also statistically significant serial correlation.

Although we did not test for the second explanation, we consider the herding behaviour by analysts as the most plausible one. Using also the I/B/E/S database, Ohlson (1996) provides empirical support for the hypothesis that herding behaviour exists, and that herding behaviour has a negative impact on the stock market performance.

6. Conclusions

The relationships between revisions in analysts' earnings forecasts, which are aggregated in this paper to a country forecast indicator, and price reactions on stock markets are not unambiguous. There is some evidence that stock returns precede forecast revisions. The adjustment of earnings forecasts itself has however no notable effect on further price movements. Our results are contrary to those of Emanuelli and Pearson (1994), which did a comparable analysis for 24 countries. Possibly, the fact that Emanuelli and Pearson chose a rather wide investment universe with a lot of emerging stock market may have contributed to different results. The pricing on such emerging markets may probably be less efficient than that on the large European stock markets, which we investigated. Further, it is interesting to note that studies, which measure price reactions around the announcement of earnings forecast revisions on company-level, give more significant results in the pre-revision period than our outcomes, which are measured on country-level. This could be caused by the fact that relevant information is lost in the aggregation from earnings forecasts for individual companies to a country-wide earnings forecasts, which are represented by the country forecast indicator. We did not take the size of the revisions into account, but only the sign of the revisions. Further research is necessary.

Another interesting outcome is the pessimistic bias of analysts in revising earnings forecasts throughout the year on average. It seems that they start the year too optimistic and adjust their forecasts downward with the release of more company specific information. In view of the empirical outcomes that stock prices precede revisions in earnings forecasts on company-level, this pattern of successive forecast revisions in itself would induce to develop an investment strategy, which models such analysts' bias.

Our findings confirm however the results of studies that the forecast capabilities of portfolio managers and financial analysts. Zimmerman and Zogg-Wetter (1992) which studied the forecast qualities of Swiss portfolio managers, found their capabilities to select individual stocks quite well in general, but to forecast price movements of stock indices far less. Womack (1996) reported similar results for North-American analysts.

A further suggestion could be to perform our analysis on industries rather than on countries. As the European economies will become more integrated over time due to the implementation of the Euro, which lead to elimination of interest and inflation differences between countries, their stock markets will show more synchronous price movements. Our study referred to the

period of 1990 to 1994; this period showed hardly any signs of integration with respect to changes in interest and inflation rates. Research using more recent data, will probably lead to more pronounced results on industry- than on country-level. Such a study will also reflect the tendency, that portfolio managers and financial analysts are more directed to industries nowadays than to countries in their asset allocation strategy.

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